Geophysical Research Abstracts
Vol. 21, EGU2019-18736-1, 2019
EGU General Assembly 2019

Probabilistic earthquake location in three-dimensional velocity models: Application to Tengchong

Yonghua Li (1,2) and Xu Yang (1,2)

(1) Institute of Geophysics,China Earthquake Adaministration, Beijing 100081, China [U+FF08]liyh@cea-igp.ac.cn[U+FF09], (2) Key Laboratory of Seismic Observation and Geophysical Imaging, China Earthquake Administration, Beijing 100081, China

Tengchong volcanic field that sits at the southeastern end of the Tibetan plateau is one of the youngest volcanoes in mainland China. Previous studies show obvious lower velocity and resistivity anomalies, suggesting crustal magma reservoirs beneath the Tengchong, but its depths are poorly constrained. The depths of magma reservoirs have been constrained by the location of earthquakes. We obtain accurate picks by employing optimized AICD automatic pickers and quality assessment scheme at temporary and permanent seismic networks surrounding Tengchong volcanic area. Based on those high-quality first-arrivals, we relocated 799 local earthquakes with magnitudes larger than 1.5, using 1D (Hypomat) and 3D (Probabilistic earthquake location) location algorithms. The comparison of relocations obtained by 1D method to those relocated in 3D crustal velocity model shows no systematic shifts in epicenter locations but sometimes large shifts in focal depth. The new 3D locations are more clustered than 1D relocations and most of events located based on the 1D model seem deeper than those located with the 3D model. Analysis of the travel-time residuals, typical seismic sequences and the location of ground blasts showed that more precise and reliable relocations were obtained with 3D location method. An absolute accuracy of $\sim$1km and 2 km for the horizontal and vertical errors are achieved by the 3D method. The earthquakes cluster primarily in the first 10 km of the crust. The cluster of earthquakes, together with the presence of the shallow low velocity anomaly imaged by previous tomography imply that the magma reservoirs the upper crust is at $\sim$10 km depth. This study was supported by NSFC (41874108).